



## JAPANESE PATENT APPLICATION

(11)Publication number: 09101786  
(43)Date of publication of application: 15.04.1997  
(21)Application number: 07258019  
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(22)Date of filing: 04.10.1995  
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(54) MELODY GENERATING DEVICE BY DSP

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to a melody generating apparatus using DSP for generating melodies such as a holding tone in an answering device, a cellular phone, etc.

[0002]

[Description of the Prior Art]

In recent years, DSP is equipped in an answering machine etc. The function conventionally performed by the analog signal processing has come to be performed by the digital signal processing. Then, various equipment is developed using DSP to generate melodies such as a holding tone.

[0011]

(Example 1)

Figure 1 (attached hereto) shows the configuration of the melody generating apparatus using DSP in the 1st example of this invention. In figure 1, 1 is a melody generating controller which performs the control of sequentially generating notes memorized in a score data table 5. 2 is a measure counter which increments a value mc for every sampling period to measure a note length. 3 is a note counter which counts a value nc indicating a note of the score data table 5 currently under performance. 4 is a score data table read-out device, and reads the note data nno, leng, gain, sno, and eno of a note indicated by the value nc of the note counter 3 from the score data table

5. The score data table 5 will be described later. 6 is a note data table read-out device, and looks for a note having a note number nno from a note data table 7. The note data table read-out device 6 reads  $T_p$  and  $T_w$ , which are parameters of the note from the note data table 7. 8 and 9 are waveform tables and store the various waveforms used for tone generating. 10 is a waveform selector and selects a waveform by waveform No. sno from the waveform tables 8 and 9. The selected waveform is used by a tone generator 11 for tone generating. 11 is the tone generator (SG), uses the data of the waveform tables 8 and 9, and generates a frequency signal  $x$  of a pitch period indicated by  $T_p$  and  $T_w$ . 12 is an envelope parameter table and stores various kinds of envelope parameters. 13 is an envelope pattern selector, which selects, from the envelope parameter table 12, envelope parameters AR, D1R, D2R, RR, D1L, and LIM, which are used in case an envelope generator 14 generates an envelope waveform. 14 is the envelope generator (EG), which generates an envelope waveform  $e$  by the selected envelope parameters AR, D1R, D2R, RR, D1L, and LIM. 15 and 16 are multipliers, which perform the multiplication of  $x$ ,  $e$ , and gain, and output a melody signal  $y$ .

[0024]

Thus, according to the 1st above-mentioned example, the score data table 5, the note data table 7, the waveform tables 8 and 9, and the envelope parameter table 12 can be memorized to ROM, and when the melody generating controller 1 controls these tables, the melody can be generated by DSP. Moreover, there is less ROM capacity used by these data tables than ROM capacity used in the conventional apparatus. Furthermore, there are few amounts of operations of processing of DSP shown in figure 9 than the conventional voice encoding and decoding method. In addition, there are the following characteristic features.

- (1) By rewriting the score data table 5, change of a melody can be performed simply.
- (2) Change of timbres can be simply performed by rewriting the waveform envelope parameter tables 8, 9, and 12.

FIGURE 1

